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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/710,723	07/30/2004	Robert J. Mills	03130.0012.PCUS00	4286
28694	7590	02/09/2006	EXAMINER	
NOVAK DRUCE & QUIGG, LLP 1300 EYE STREET NW 400 EAST TOWER WASHINGTON, DC 20005			NGUYEN, NINH H	
			ART UNIT	PAPER NUMBER
			3745	

DATE MAILED: 02/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/710,723

Applicant(s)

MILLS ET AL.

Examiner

Ninh H. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 and 39-70 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 53-70 is/are allowed.
- 6) ☒ Claim(s) See Continuation Sheet is/are rejected.
- 7) ☒ Claim(s) See Continuation Sheet is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

Continuation of Disposition of Claims: Claims rejected are 1-3, 4/1-4/3, 5/1-5/3, 8/1-8/3, 9/1-9/3, 10/1-10/3, 11/1-11/3, 39/1-39/3, 40/1-40/3, 41/1-41/3, 44/1-44/3, and 45/1-45/3, 47/1-47/3, 48/1-48/3, and 49/1-49/3.

Continuation of Disposition of Claims: Claims objected to are 6/1-6/3, 7/1-7/3, 10/1-10/3, 11/1-11/3, 14/1-14/3, 15-1-15/3, 16/1-16/3, 17/1-17/3, 43/1-43/3, 46/1-46/3, 50/1-50/3, 51/1-51/3, 52/1-52/3.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3, 4/1-4/3, 5/1-5/3, 8/1-8/3, 9/1-9/3, 10/1-10/3, 11/1-11/3, 39/1-39/3, 40/1-40/3, 41/1-41/3, 44/1-44/3, and 45/1-45/3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dorman (5,313,700) in view of Chou (5,169,290).

Dorman inherently discloses a method comprising including on a flying aircraft, an aircraft-powering turbofan assembly comprising multiple fan blades mounted on a fan disc and each of the fan blades having a leading edge, a trailing edge, and two side surfaces that comprise a high-pressure side surface and a low-pressure side surface, the turbofan assembly inherently being configured such that a laminar-to-turbulent boundary layer transition occurs on at least one of the side surfaces of each of the fan blades during flight, and an aggregate limited stress occurring in the turbofan assembly at a mounting of the respective fan blade to the fan disc is inherently composed at least partially by fluctuating stresses.

However, Dorman does not disclose in the including step a laminar-to-turbulent boundary layer transition control feature at the side surface of the respective fan blade at which the transition occurs, each of the control features initiating and positionally stabilizing a laminar-to-turbulent boundary layer transition to a location upon the respective fan blade between the control feature and the respective fan blade's trailing edge as claimed.

Chou teaches a fan blade comprising an airfoil having a suction side surface, a pressure side surface, a leading edge, a trailing edge, wherein the fan blade is configured such that a laminar-to-turbulent boundary layer transition occurs on at least one of the side surfaces of the fan blade during operation, a laminar-to-turbulent boundary layer transition control feature 21 on the pressure side surface of the blade which initiates and positionally stabilizes a laminar-to-turbulent boundary layer transition to a location upon the fan blade between the control feature and the respective fan blade's trailing edge (Fig. 3B; col. 2, lines 43-58);

wherein the blade is inherently operates in non-stall conditions;

wherein the laminar-to-turbulent boundary layer transition control features 21 is located on the pressure side surface and having an essentially smooth surface portion located between the leading and trailing edges and the feature comprising a surface deviation constituting a departure from the essentially smooth surface portion (Figs. 4A-4D);

wherein the departure from the essentially smooth surface portion is constituted by a reduced-elevation surficial portion, compared to the essentially smooth surface portion (Figs. 4C, 4D);

wherein the departure from the essentially smooth surface portion is constituted by a raised-elevation surficial portion, compared to the essentially smooth surface portion (Figs. 4A, 4B);

wherein the departure from the essentially smooth surface portion is an elongate strip-shaped area of raised elevation spanning the entire length of the blade (col. 3, lines 1-3), and positioned chordwise between the fan blade leading edge and the fan blade trailing edge (Figs. 4A-4D).

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It would have been obvious to a person having ordinary skill in the art at the time the invention was made, to make the turbine blade of Dorman with a laminar-to-turbulent boundary layer transition control feature at the side surface of the respective fan blade at which the transition occurs, each of the control features initiating and positionally stabilizing a laminar-to-turbulent boundary layer transition to a location upon the respective fan blade between the control feature and the respective fan blade's trailing edge for the purpose of improving the fan blade efficiency as taught by Chou.

Even though Chou teaches a fan blade for an HVAC system, the control of a boundary layer on an airfoil, either of an HVAC fan blade or of a turbofan blade, is an art by itself as taught by Chou (col. 1, lines 20-34; and 50-59). Therefore, it is appropriate to combine the teaching Dorman and Chou in this Office Action.

3. Claims 47/1-47/3, 48/1-48/3, and 49/1-49/3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dorman in view of Chou.

Dorman discloses all the limitations except the departure from the essentially smooth surface portion is not about one-tenth of an inch wide as claimed.

Since the applicant has not disclosed that having the departure from the essentially smooth surface portion being about one-tenth of an inch wide solves any stated problem or is for any particular purpose above the fact that the departure from the essentially smooth surface portion affects the boundary layer of the airfoil, and it appears that the modified method of Dorman would perform equally well with the shape and dimensions as defined claimed by

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applicant, it would have been an obvious matter of design choice to modify the method of Dorman by utilizing the specific dimension as claimed.

Allowable Subject Matter

4. Claims 53-70, due to the method step of determining a range of translation of an unstable transition point between a laminar and a turbulent boundary layer on one of the first side and the second side of at least one of the plurality of unmodified fan blades, are allowed.

3. Claims 6/1-6/3, 7/1-7/3, 10/1-10/3, 11/1-11/3, 14/1-14/3, 15-1-15/3, 16/1-16/3, 17/1-17/3, 43/1-43/3, 46/1-46/3, 50/1-50/3, 51/1-51/3, 52/1-52/3 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Prior Art

The prior art made of record but not relied upon is considered pertinent to applicant's disclosure and consists of 2 patents.

Kueth (3,578,264) and Ramesh et al. (6,416,289) are cited to show difference boundary layer controlling devices.

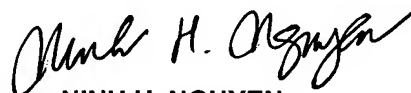
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Ninh Nguyen whose telephone number is (571) 272-4823. The examiner can be normally reached on Monday-Friday from 7:30 A.M. to 5:00 P.M.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Look, can be reached at (571) 272-4820. The fax number for this group is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, please go to <http://pair-direct.uspto.gov> or contact the Electronic Business center (EBC) at 866-217-9197 (toll-free).


NINH H. NGUYEN
PRIMARY EXAMINER

Nhn
February 6, 2006